EFFECTIVENESS OF GOAL ATTAINMENT SCORING AS A CLINCIAL MEASURMENT IN ELDERLY PARKINSON PATIENTS WITH GAIT ABNORMALITIES

DISSERTATION

Submitted for the partial fulfillment of the requirement for the degree of

MASTER OF PHYSIOTHERAPY (MPT)

(Elective –Advanced Physiotherapy in Neurology)

APRIL – 2018

By

Regn. No: 271620262

Submitted to:

THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY

CHENNAI – 60003

EFFECTIVENESS OF GOAL ATTAINMENT SCORING AS A CLINCIAL MEASURMENT IN ELDERLY PARKINSON PATIENTS WITH GAIT ABNORMALITIES

DISSERTATION

Submitted for the partial fulfillment of the requirement for the degree of

MASTER OF PHYSIOTHERAPY (MPT)

(Elective –Advanced Physiotherapy in Neurology)

APRIL – 2018

Regn. No: 271620262

MOHAMED SATHAK A.J COLLEGE OF PHYSIOTHERAPY
144/1, Nungambakkam High Road,
Nungambakkam, Chennai – 600034

MOHAMED SATHAK A. J COLLEGE OF PHYSIOTHERAPY

Nungambakkam, Chennai – 600034.

This is to certify that the Dissertation entitled "**EFFECTIVENESS OF GOAL ATTAINTMENT SCORING AS A CLINCIAL MEASURMENT IN ELDERLY PARKINSON PATIENTS WITH GAIT ABNORMALITIES**" was done by Bearing Regn. No:**271620262.** This work has been done as a partial fulfillment for the degree of Master of Physiotherapy done at **Mohamed Sathak A.J College of Physiotherapy**, Chennai and submitted in the year April 2018to **The Tamilnadu Dr. M.G.R Medical University, Chennai.**

Date:

Place: Chennai

Seal & Signature of Principal

……..…

Prof. R. Radhakrishnan, MPT., PGDHM.,

Mohamed Sathak A .J College of Physiotherapy

MOHAMED SATHAK A. J COLLEGE OF PHYSIOTHERAPY

Nungambakkam, Chennai – 600034.

CERTIFICATE

This is to certify that the Dissertation entitled "**EFFECTIVENESS OF GOAL ATTAINMENT SCORING AS A CLINCIAL MEASURMENT IN ELDERLY PARKINSON PATIENTS WITH GAIT ABNORMALITIES"** was done by Bearing Regn. No**: 271620262**.Thiswork has been done under my direct guidance and supervision for the partial fulfillment of therequirement of Master of Physiotherapy degree **at Mohamed Sathak A.J college ofPhysiotherapy**, Chennai, and submitted during the year April 2018 to **The Tamilnadu Dr. M.G.R Medical University, Chennai.**

Signature of Guide

Date:

Place: Chennai **…..…….**

Prof. K.PREMANAND , MPT (Neuro).,

Mohamed Sathak A.J College of Physiotherapy

CERTIFICATE

MOHAMED SATHAK A.J COLLEGE OF PHYSIOTHERAPY

Nungambakkam, Chennai – 600034.

This is to certify that the Dissertation entitled **"EFFECTIVENESS OF GOAL ATTAINMENT SCORING AS A CLINCIAL MEASURMENT IN ELDERLY PARKINSON PATIENTS WITH GAIT ABNORMALITIES"** was done by Bearing Regn. No**:271620262 .** The undersigned examiners has duly verified and examined the submitted Dissertation done by the above candidate.

…… ……

Internal Examiner **External Examiner**

Place:

Date:

DECLARATION BY THE CANDIDATE

I hereby declare that the Dissertation entitled "**EFFECTIVENESS OF GOAL ATTAINMENT SCORING AS A CLINCIAL MEASURMENT IN ELDERLY PARKINSON PATIENTS WITH GAIT ABNORMALITIES"** was done by me for the partial fulfillment of the requirement of Master of Physiotherapy degree. The dissertation had been done under the direct supervision andguidance of my Guide **Prof.K.PREMANAND,MPT**., at **Mohamed Sathak A.J college of Physiotherapy**, Chennai, and submitted the same during the year April 2018 to **TheTamilnadu Dr. M.G.R Medical University, Chennai.**

Date:

Place: Chennai

…..……

Signature of the Candida

ACKNOWLEDGEMENT

I thank the **Almighty** for blessing me in all aspects to complete the project successfully.

I thank our **Management** for providing sufficient books, good faculties and facilitating us to gain a wide knowledge on our field.

My sincere thanks to our respectable **Correspondent Mr. Alhaj E.S.M.A. Basheer Ahmed** and our **Director Mr. Janab Mohamed Arshad,** Mohammed Sathak A.J College of Physiotherapy, Chennai.

I have an immense pleasure to express my deep sense of gratitude and fulsome thanks to our most respected and beloved Principal **Prof. R. RADHAKRISHNAN MPT, PGDHM**, for his valuable advice and encouragement.

I am deeply indebted in expressing my sincere and heartfelt thanks to my guide **Prof. K.PREMAND**, **MPT (Neuro),** for his continual support, profound interest and timeless and valuable suggestion throughout the period of this study.

With immense gratitude, I thank all our **teaching** and **non-teaching staff** for their Constant encouragement and support made me perform better

I extend my thanks to all who motivated and helped me in all aspects to complete the study

INDEX

1. ABSTRACT

BACKGROUND OF THE STUDY

Goal Attainment Scaling is a valid instrument for measuring change in function in rehabilitation as compared to any other standardized scoring instruments. The success of Goal Attainment Scaling depends on the following characteristics setting up Specific, Measurable, Achievable, Realistic, Timed goals Quantify Performance Evaluating goal achievement

OBJECTIVE

To establish an effective scoring method for evaluation of functional outcomes and to measure change in functional ability in Parkinson patients.Though Goal Attainment Scaling method of measuring function has been effectively applied in various conditions like Low Back Pain, Communication disorders, measuring arm function in stroke patients, none of the studies have been done on its application in Parkinson patients.

METHODOLOGY

There are twenty elderly Parkinson patientswere analyzed with the study design of Prospective quasi experimental Study with pre and post experimental design. The study populations have patients with gait abnormalities receiving home based physiotherapy care. Subjects were assessed for the period of 3 months by Goal attainment scale.

RESULTS

The Goal Attainment Scores for patients before and after treatment for 3 months were statistically analysed and they show a significant improvement in their functional status evident from the unpaired t test p value of less than 0.0001.

CONCLUSION

The study reinforced the importance of Goal Attainment Scaling as a versatile tool to be used to evaluate change in function in rehabilitation of Parkinson patients in addition to providing a quantitative measure of service outcomes. Goal Attainment Scaling also has therapeutic utility, increasing patients' self-awareness, goal orientation as well as helping the rehabilitation process to be goal directed.

2. INTRODUCTION

Measuring effectiveness of treatment in rehabilitation imposes major problems due to the heterogeneity of patient's deficits and desired outcomes. So goals are very important for effective patient participation. Goal setting has become a routine part of rehabilitation and many multidisciplinary approaches to clinical care. There substantial evidence which demonstrates its usefulness, both as part of communication and decision making process, and as person centered outcome measure for rehabilitation. Measurement of functional outcome through Goal Attainment Scaling was first introduced by Kirusek and Sherman for assessing outcomes in mental health settings. Since then it has been modified and applied in many other areas.

Goal Attainment Scaling offers number of potential advantages as an outcome measure for rehabilitation. As goal setting is already a part of routine clinical practice in many centers, it builds on this already established process to encourage communication and collaboration between multidisciplinary team members and patient involvement - as goals are set in consultation with patients and also patients are motivated to reach their goals. Originally goal attainment scaling was developed simply as an outcome measure but the process may also be in itself a therapeutic intervention and a useful tool in case management.

Goal Attainment Scoring is a method of scoring the extent to which patient's individual goals are achieved in the course of intervention. In effect each patient has their own outcome measure but this is scored in a standardized way as to allow statistical analysis. In this type of scoring, tasks are individually identified to suit the

patient and the levels are individually set around their current and expected levels of performance.

It is well recognized that goal setting is an effective way of achieving behavioral change in people. It is generally agreed that good goals should be Specific, Measurable, Achievable, Realistic, and Timed (SMART). An important feature of Goal Attainment Scaling is the ‘a priori’ establishment of criteria for a successful outcome in that individual, which is agreed between the patient and therapist.

At the appointed review date the level achieved is determined by the patient and the team. In rehabilitation, GAS is more sensitive to change than the Barthel Index and Functional Independence Measure. In some studies, GAS is the only method capable of detecting a change after treatment.

Goal Attainment Scoring has been applied in various settings like community rehabilitation of elderly, reduction of upper limb spasticity etc. This study is about the effectiveness of Goal Attainment Scoring in elderly individuals affected by Parkinsonism.

Parkinson’s disease (PD) is a neurodegenerative disorder characterized by cardinal features resting tremor, rigidity, bradykinesia, and postural difficulties. Patients with PD have difficulties in performing various motor tasks, such as walking, writing and speaking. Postural instability (PI) is a disabling disorder, which is associated with sudden falls, progressive loss of independence, Gait disorders, along with turning and balance disturbances, are the most important determinants of falls. Hence an effective goal setting in consultation with patient and their care takers is essential for interventions aimed at improving functional mobility in these patients. A variety of standardized instruments have been used to assess outcomes of

rehabilitation in these Parkinson affected patients but none have involved the patients in process of goal setting.

Parkinson is a neurodegenerative disorder producing gradual reduction in the functional mobility of the patients. Interventions are targeted to maintain the level of functional mobility of the patients.

Rehabilitation of postural and gait disturbances in Parkinson's disease involves rehabilitation of postural instability and strategies to prevent falling, Strengthening and balance exercises, stepping training, auditory and visual cueing.

2.1 AIM OF THE STUDY

To establish an effective scoring method for evaluation of functional outcomes and to measure change in functional ability in Parkinson patients.

2.2 NEED OF THE STUDY

Though Goal Attainment Scaling method of measuring function has been effectively applied in various conditions like Low Back Pain, Communication disorders, measuring arm function in stroke patients, none of the studies have been done on its application in Parkinson patients

2.3 BACKGROUND OF THE STUDY

Goal Attainment Scaling is a valid instrument for measuring change in function in rehabilitation as compared to any other standardized scoring instruments. The success of Goal Attainment Scaling depends on the following characteristics Setting up Specific, Measurable, Achievable, Realistic, Timed goals Quantify Performance Evaluating goal achievement

2.4 HYPOTHESIS

NULL HYPOTHESIS: Goal Attainment Scaling is not a valid scoring instrument for measurement of change in functional ability in Parkinson patients.

ALTERNATE HYPOTHESIS: Goal Attainment Scaling is a valid scoring instrument for measurement of change in functional ability in Parkinson patients.

3. REVIEW OF LITERATURE

1. Stephen Ashford et al, Goal setting, using goal attainment scaling, as a method to identify patient selected items for measuring arm function, Physiotherapy, 101(2015), 88-94.

It was a prospective observational cohort study on rehabilitation of the hemi paretic upper limb in patients with traumatic brain injury. It concluded that goal setting is a method to involve patients and care takers in the identification of clinically relevant measurement items.

2. Hanssen KT et al, Goal attainment in cognitive rehabilitation in MS patients. Neuropsychological Rehabilitation 2015;25 (1):137-54. doi: 10.1080/ 09602011.2014.971818.

The aim of the study was to investigate the predictive value of important disease-related variables on goal attainment in cognitive rehabilitation in multiple sclerosis. GAS-goal attainment was scored during biweekly follow-up calls in the first three months post-discharge from the rehabilitation centre, and finally at seven months after the start of the rehabilitation. The patients were able to maintain a satisfactory level of goal attainment from the first measurement point after six weeks to seven months after the start of the rehabilitation. Goal Attainment Scaling is a robust method of measuring function.

3.Lynne Turner-Stokes et al, Upper limb international spasticity study: rationale and protocol for a large, international, multi centre prospective cohort study investigating management and goal attainment following treatment with botulinum toxin A in real-life clinical practice BMJ Open 2013;3:e002230. doi:10.1136/bmjopen-2012-002230

It was an international, multi centre, observational, prospective, before-and after study, conducted at 84 centres in 22 countries across three continents. The primary outcome measure was Goal Attainment Scaling.

The results of the study showed goal setting is a complex process, which requires skill and experience on the part of investigators—both to coin the SMART goal description and also to be able to predict the likely outcome of the intervention and its timescale. This study has emphasized the need for training in consistent goal-setting techniques as highlighted in other studies.

4. KrasnyPacini et al, Goal Attainment Scaling in rehabilitation: A literature-based update, Annals of Physical Medicine and Rehabilitation 56 (2013)

This article presents the literature debates on GAS, variations of GAS (in terms of the s score level assigned to the patient's initial status and description of the scale's different levels), the precautions to be taken to produce valid GAS scales and the various ways of analyzing GAS results.

5. Per Ertzgaard, et al, Practical considerations for goal attainment scaling during rehabilitation following acquired brain injury, J Rehabil Med 2011; 43: 8–14

Goal attainment scaling represents a unique approach to identifying and quantifying individualized, meaningful treatment outcomes, and its use in the rehabilitation medicine setting is increasing. The aim of this paper is to discuss the available literature for goal attainment scaling in patients with acquired brain injury, in terms of its advantages, disadvantages and practical application, including examples of goal setting and scaling. GAS measures clinically meaningful change in activity/participation status in patients undergoing rehabilitation for disability caused by ABI.

6.Thamar JH Bovend'Eerdtetal, Writing SMART rehabilitation goals and achieving goal attainment scaling: a practical guide, Clinical Rehabilitation 2009; 23: 352–361

The study formulates the approach to setting of specific, measurable, achievable and realistic timed goals in rehabilitation. The success of goal setting and goal attainment scaling depends on the formulation of the goals. The method described here is a useful tool to standardize the writing of goals in rehabilitation. It saves time and simplifies the construction of goals that are sufficiently specific to be measurable.

7. Thamar J.H. Bovend'Eerdt, PhD, Helen Dawes, PhD et al Agreement between two different scoring procedures for goal attainment scaling is low, Journal of Rehabilitation Medicine 2011; 43: 46–49

The study investigated the agreement between a patient's therapist and an independent assessor in scoring goal attainment by a patient. The patients' therapists set 2–4 goals using a goal attainment scaling method. Six weeks later attainment was scored by the treating therapists and an independent assessor unfamiliar with the patient, using a semi-structured interview method with direct assessment as appropriate.The agreement between the patients' therapists scoring the goals and the independent assessor was low, signifying a large difference between the two scoring procedures. Efforts should be made to improve the reproducibility of goal attainment scaling before it is to be used as an outcome measure in blinded randomized controlled trials.

8. Colin Sharp, Philip Read, Goal Attainment Scaling in early childhood intervention, issues for implementation and evaluation, Evaluation Journal of Australasia, Volume 11, 2011, Pg 31 -41.

A repeated measures comparison of three intervention groups of visually impaired children showed a statistically significant effect, indicating that GAS was sufficiently clinically sensitive to detect small changes in individuals and small groups over several weeks of intervention and observation. The qualitative data revealed a positive appreciation by all stakeholders of the opportunity for parents to become involved in goal setting and evaluation of their child's program. The importance of creating and maintaining a goal focused culture among stakeholders emerged as a key consideration in an effective implementation of GAS.

9. Anne F. Mannion, Goal attainment scaling as a measure of treatment success after physiotherapy for chronic low back pain, Rheumatology 2010;49: 1734–1738

In some chronic conditions, patient-specific tools with individualized items have proved to be more sensitive outcome instruments than fixed-item tools; their use has not yet been investigated in chronic low back pain. Post-therapy, goal attainment scaling (GAS) scores were calculated regarding achievement of 2–6 priority GAS goals established pre-therapy; global outcome of therapy was assessed on a 5-point Likert scale. Sixty-five per cent of the patients had a successful outcome according to GAS (i.e. a score >50); 55%, according to global outcome (therapy helped/helped a lot); 39%, according to the RM score change (score decrease >30%); and 44%, according to the pain score change (score decrease >30%). GAS demonstrates the achievement of important goals undetected by fixed-item measures and is a valid and sensitive outcome measure for assessing the success of rehabilitation in patients with chronic Low Back Pain.

10. Anne F. Mannion, Goal attainment scaling as a measure of treatment success after physiotherapy for chronic low back pain, Rheumatology 2010;49: 1734–1738

The review shows wide range of physiotherapy interventions are used to treat Parkinson’s disease. The interventions delivered and the outcomes assessed varied so much that the results of individual trials could not be combined. It suggests a multidisciplinary approach to the treatment of Parkinson’s disease.

11. Janette McDougal et al, The international classification of functioning, disability for child and young and Goal Attainment Scaling: Benefits of their combined use for paediatric practice, Disability and Rehabilitation, Volume 13, issue 16, 2009

Used in combination with ICF-CY, Goal Attainment Scaling can serve to coordinate, simplify and standardize assessment and outcome evaluation practices for individual clients receiving paediatric rehabilitation.

12.Goal attainment scaling as a clinical measurement technique in communication disorders: a critical review. Journal of Communication Disorders 37 (2004) 217–239

The purpose of this paper is threefold: (a) to introduce GAS to the field of communication disorders, (b) to offer a critical review, and (c) to explore directions for harnessing the value of GAS for the field. In addition to the ability of GAS to evaluate individualized longitudinal change, it offers the following positive attributes.

As demonstrated in this paper, GAS offers unique values such as an a priori expectation on change, a codified range of change, a sharpening of the focus of goals, a sharpening of the focus of treatment protocols, and capturing of subtle-but-important change in client-centered functional skills. This review also showed that GAS is not without issues that may delimit its utility when not taken seriously. Because of its unique values, however, GAS should be considered a welcomed addition (not a replacement) to the present set of options available to clinicians, administrators, and researchers interested in assessing change.

13. David J Evans et al,Goal Attainment Scaling in a geriatric day hospital, Team and program benefits, Canadian Family Physician, Vol 45, 1999

The study was done to determine whether Goal Attainment Scaling (GAS) could be introduced to facilitate interdisciplinary processes and to generate useful health outcome data. The GAS procedures were incorporated into clinical routines based on published guidelines. The authors determined GAS outcome scores for patients who completed the program and developed outcome scores for specific geriatric problem areas requiring intervention. Goal attainment scaling was successfully introduced to a geriatric day hospital. Procedures were introduced in stages that produced incremental benefits. Team processes were thought to be improved by focusing on patient goals in a structured way. The GAS provided data on both patient outcomes and outcomes of interventions in specific problem areas. Accountability for patient care increased. Goal Attainment Scaling provided indicators of care for which clinicians could develop program quality improvements. Use of GAS gives an objective measure of patients' progress toward attaining objectives set during an initial evaluation.

14. James F Malec, Goal Attainment Scaling and Outcome Measurement in Post-acute Brain Injury Rehabilitation, Archives of Phys Med Rehabilitation 1991:72: 13843.

Relationships among two-month and final goal attainment scaling (GAS) scores, Adaptability Inventory (PAI) scores, and work outcome for 16 graduates of a comprehensive, post-acute brain injury rehabilitation program were examined. Results of this study and case analyses support GAS as a quantifiable, individualized measure that is useful for

(1) Monitoring patient progress

(2) Structuring team conferences

(3) Ongoing rehabilitation planning and decision-making,

(4) Concise, relevant communication to family referral sources, and funding sources

(5) Overall program evaluation when used in the context of other objective outcome measures. Clinical experience, as illustrated in our case examples, suggests to us that GAS also has therapeutic utility, increasing patients' self-awareness and goal orientation as well as helping the rehabilitation process to be goal-directed. GAS offers the program participant a concrete, individualized focus for multiple, abstract goals.

15. Khan F. et al. Use of foal attainment scaling in inpatient rehabilitation for persons with multiple sclerosis.rchives of physical medicine and rehabilitation, 2008 Apr;89(4):652-9. doi: 10.1016/j.apmr.2007.09.049.

To use goal attainment scaling (GAS) to measure clinically important functional change in persons with multiple sclerosis (MS) and to assess its responsiveness compared with standard measures used to evaluate progress in rehabilitation. GAS scores were calculated for 5 to 10 priority goals set prospectively by each patient in agreement with the multidisciplinary treating team and compared with standard outcome measures-the FIM instrument and Barthel Index-rated on admission and discharge from the program. Patients were categorized into responders and non-responders based on an overall clinical global impression. Of 203 selected goals, 167 were achieved at the predicted level. GAS recorded outcomes for 105 individualized goals not measured by the FIM and Barthel Index. Although all 3

measures showed statistically significant change from admission to discharge (P<.001), only GAS scores strongly correlated with the Clinical Global Impression scale (rho=-.86, P<.001). Different measures of effect size gave different results, but GAS was consistently more responsive than either the FIM or Barthel Index.

4. METHODOLOGY

4.1 STUDY DESIGN:

Prospective quasi experimental Study with pre and post experimental design

4.2 STUDY SETUP:

Home based physiotherapy care

4.3 STUDY POPULATION:

Patients with gait abnormalities receiving home based physiotherapy care.

4.4 SAMPLE SIZE:

Twenty Parkinson patients

4.5 STUDY DURATION:

Three months.

4.6 INCLUSION CRITERIA:

- Age greater than 60
- Parkinson Disease for more than 3months
- Unified Parkinson's Disease Rating Scale 1, 2 and 3
- Mini Mental Scale Examinaion score greater than 24
- Dynamic Gait Index score of less than 16, falling under risk of falls category
- Agreement on an achievable goal set and ability to comply with the prescribed treatment.

4.7 EXCLUSION CRITERIA

- Surgical conditions of brain
- Patients with fractures or deformities in Lower limbs
- Patients who are not under medication for Parkinson disease
- Previous Traumatic injuries of brain

4.8 MATERIALS USED:

Stop watch, chair, marking cones, pencil.

5. PROCEDURE

Informed consent was obtained from the participants of the study after verbally explaining the characteristics of the study to the patient and his care giver.

On inclusion into the study, the following assessments were recorded by the investigator

- Demography and history of Parkinson including type, location and time since onset.
- The pattern of impairment and stage of disease using UPDRS scaling and the presence of any generalized impairments that may affect outcome (including cognitive, emotional and behavioural function) were recorded using MMSE scale
- Clinical examination, neurological examination
- Observational Gait Assessment
- Goal setting and GAS were applied using the 'GAS-light' method as detailed below with emphasis on setting SMART (specific, measurable, achievable, realistic and timed) goals agreed between the investigator, the patient and the treating team. One primary and up to three secondary goals were set and assigned to one of seven goal categories.

The individual therapeutic goals were established in consultation with the patients and their care givers. The weightage of importance of each of goals were determined and entered into the tabulator in consultation with the patient and their stake holders or care givers. The baseline GAS scores were calculated according to

the weightage of the goals according to the guidelines set by Kiresuk and Sherman et al. Their baseline Dynamic Gait index scores and Timed Up and Go Scores were entered into their respective data collection forms specifically designed for the study.

The scores were then converted to a GAS T-score using the formula provided by Kiresuk et al using the GAS tools tabulator.

Each goal was examined by the corresponding treating therapist together with the patient and its relative achievement rated as follows:

At the expected level (score of 0),

Less than expected -1, no change from baseline;

-2, much less than baseline

More than expected +1,

+2, much more than expected.

At the appointed review date the level achieved is determined by the patient and the team. The level of achievement is again entered into the GAS tools tabulator.

The dynamic gait index and functional ambulation scores at end of one, two, three months were also calculated and entered into separate data collections forms.

5.1 OUTCOME MEASURES:

5.1.1 TIMED UP AND GO TEST:

The patient seated in a chair, a distance of 5 meters is marked using a marking cone. The patient is then asked to get up from the chair walked up to the marked cone and return back and sit in the chair again. The time taken for the task is noted.

TIMED UP AND GO

5.1.2 DYNAMIC GAIT INDEX

The patient is asked to walk a preset marked distance with varying surfaces. The time taken and gait abnormalities are rated on a four point scale.

DYNAMIC GAIT INDEX

6. STATISTICAL ANALYSIS

Table 6.1

	MEAN		SD		T VALUE	P VALUE
	PRE	POST	PRE	POST		
TUG	13.04	11.205	1.076	1.317	4.8416	0.00011
GAS	30.375	63.23	4.063	7.412	17.38308	<0.0001
DGI	9.30	15.20	3.74	3.65	5.0465	0.00011

ONE WAY ANOVA FOR 3 INDEPENDENT TREATMENTS

Table 6.2

	DEGREES OF FREEDOM	MEAN SQUARE	F STATISTIC	P VALUE
TREATMENT	2	5620.147	387.327	1.1102E-16
ERROR	57	14.5101		
TOTAL	12067.37	59		

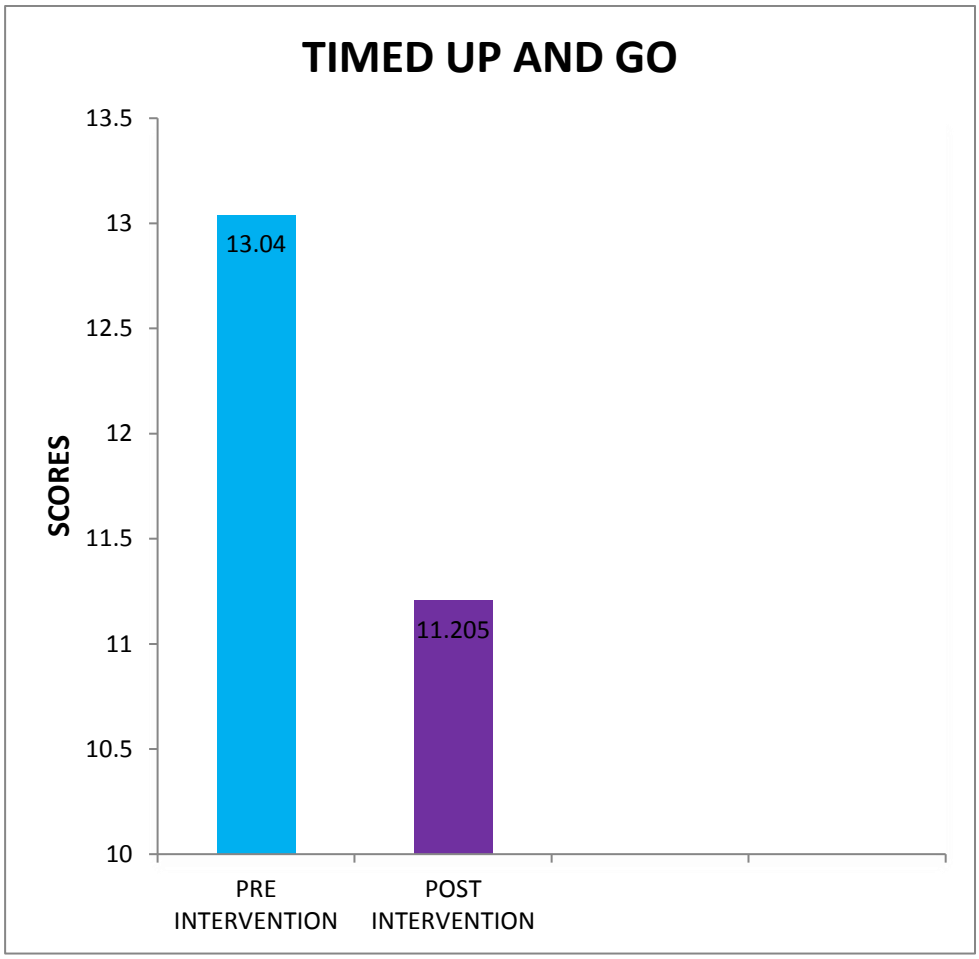
RESULTS OF ONE WAY ANOVA: The p value corresponding to the F-statistic of one way ANOVA is lower than 0.05, suggesting that the one or more treatments are significantly different.

Tukeys HSD test was performed to analyse the difference between the three outcome measures.

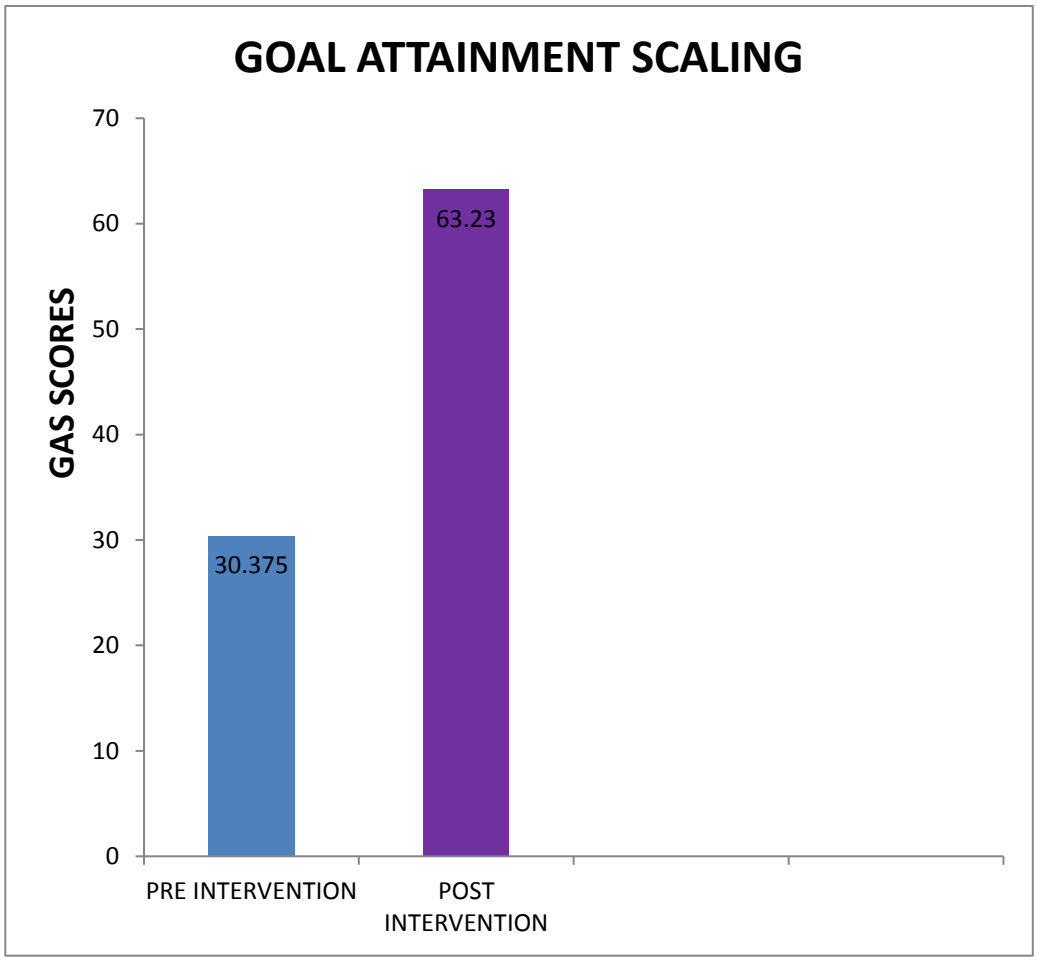
Tukeys HSD results:

Treatments pair	**Tukey HSD Q statistic**	**Tukey HSD p-value**	**Tukey HSD inference**
A vs B	36.1866	0.0010053	** p<0.01
A vs C	4.6815	0.0045464	** p<0.01
B vs C	31.5052	0.0010053	** p<0.01

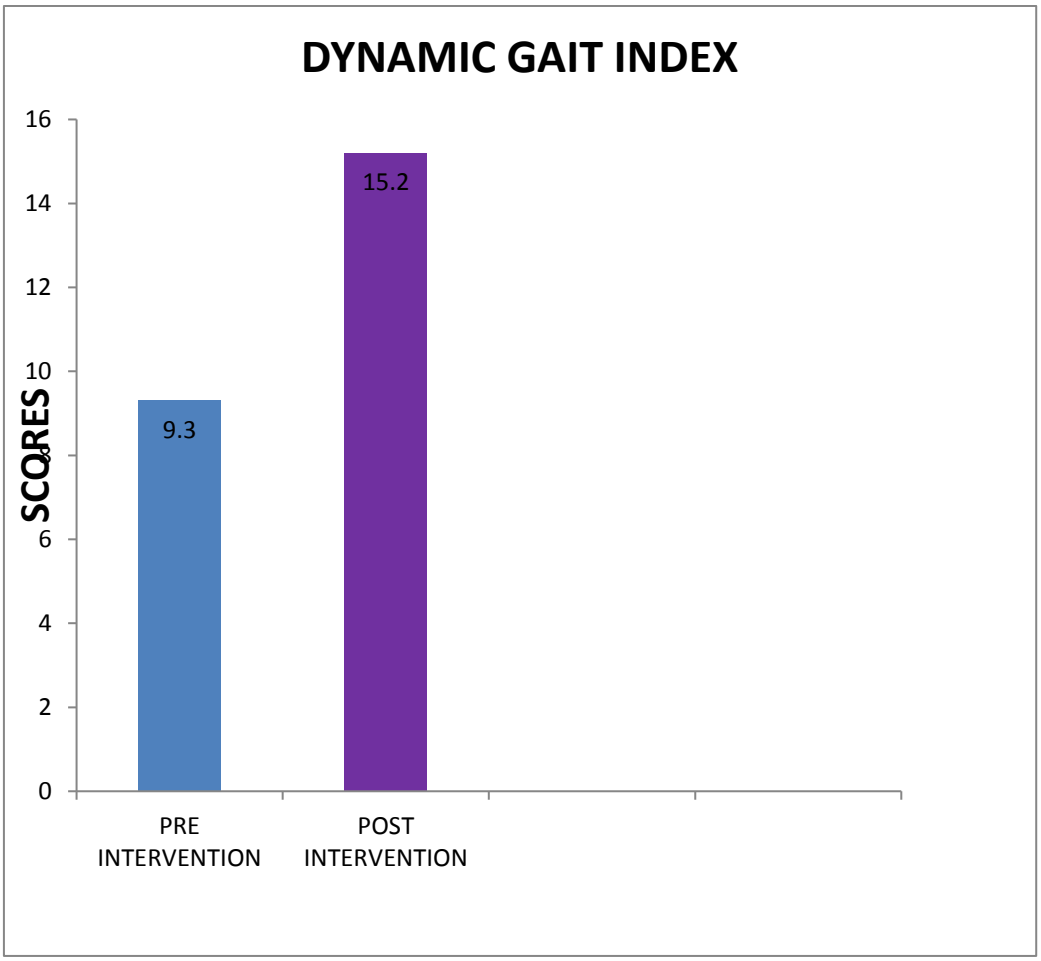
Graphical representation 6.3



Graphical Representation 6.4



Graphical Representation 6.5



MASTER CHART

GAS scores	Pre Intervention	Post Intervention
Dayananadam	30	70
Krishnamurthy	30.5	70.4
Sampoornam	30.5	60.3
Sundaram	30	60.8
Rajalakshmi	36.8	70.8
Balasubramanian M	30.7	60.7
Sundari	30.5	50.5
Pattammal	30	70
Balasubramanian R	40	70
Manikkam	30	50
Neelambal	27.9	63.6
Sharadha	22.8	58.5

Ramachandran K	27.2	68.3
Iyer S K	31.7	63.7
Muthulakshmi	31.2	58.1
Sounderrajan	32.4	72
Subathra Devi	23.8	50
Rajeswari	26.0	59
Santhanam	36.3	72.8
Subramaniam	29.2	65.1

	Pre intervention	**Post intervention**	**T value**	**P value**
Mean	30.375	63.23	17.38308	<.0001
Standard Deviation	4.063	7.412		

TUG scores	Pre intervention	Post intervention
Dayananadam	13.5	10
Krishnamurthy	14	12.25
Sampoornam	12.30	11.05
Sundaram	14.10	12.40
Rajalakshmi	13.25	12.60
Balasubramanian M	12.40	10.60
Sundari	13.35	12.50
Pattammal	13.70	12.70
Balasubramanian R	10.30	9.50
Manikkam	14.30	13.30
Neelambal	12.70	11.60
Sharadha	11.30	10.30
Ramachandran K	13.70	11.85

Iyer S K	14.40	12.70
Muthulakshmi	12.60	11.20
Sounderrajan	11.5	9.5
Subathra Devi	12.70	9.70
Rajeswari	13.70	9.70
Santhanam	13.40	9.15
Subramaniam	13.70	11.50

	Pre intervention	**Post intervention**	**T value**	**P value**
Mean	13.04	11.205	4.8416	0.00011
Standard Deviation	1.076	1.316		

Dynamic Gait index scores	Pre intervention	Post intervention
Dayananadam	6	16
Krishnamurthy	6	14
Sampoornam	14	22
Sundaram	10	16
Rajalakshmi	8	12
Balasubramanian M	10	18
Sundari	4	12
Pattammal	7	11
Balasubramanian R	16	21
Manikkam	5	12
Neelambal	9	12
Sharadha	15	19
Ramachandran K	13	16
Iyer S K	5	11

Muthulakshmi	12	17
Sounderrajan	13	18
Subathra Devi	4	8
Rajeswari	8	16
Santhanam	9	15
Subramaniam	12	18

	Pre intervention	**Post intervention**	**T value**	**P value**
Mean	9.30	15.20	5.0465	0.00011
Standard Deviation	3.74	3.65		

7. RESULTS

The Goal Attainment Scores for patients before and after treatment for 3 months were statistically analysed and they show a significant improvement in their functional status evident from the unpaired t test p value of less than 0.0001 as given in table 6.1

The Timed Up and Go scores for the patients before and after treatment for 3 months were compared using unpaired t test produced a significant value of less than 0.0001 as given in table 6.1

Similarly the Dynamic Gait index scores before and after treatment for 3 months also produced a significant p value of less than 0.0001 for the unpaired t test as given in table 6.1.

The graphical representation of pre intervention and post intervention scores for Goal Attainment Scaling, Time up and Go scoring and Dynamic Gait Index Scoring are also given the graphical representations 6.3, 6.4, 6.5 respectively.

The Goal attainment scores, Timed up and Go scores and the Dynamic Gait Index scores were statistically compared using one way Anova analysis for three independent outcome measures and it also produced a statistically significant P value of 1.1102E-16. This value showed that the three outcome measures were significantly different and is given in table 6.2.

8. DISCUSSION

The above study was conducted to evaluate the effectiveness of Goal Attainment Scoring in evaluating the functional changes in persons affected with Parkinson. After informed consent, the baseline goal attainment score was calculated for the participants. After three months of intervention, the goal attainment scores were calculated and compared with baseline score. The change in Goal attainment score was in concordance with the changes in Timed Up and Go scores and Dynamic Index Scores measured similarly at baseline and after three months of intervention.

The one way ANOVA conducted on the three outcome measures produced a significant p value noting that the three outcomes measures were different from each other. Further the Tukeys HSD test also established the fact that all three outcome measures correlate well and produce a statistically significant change in function.

The validity of GAS is supported in this study by the significant correlations between GAS scores obtained at baseline and at program end and between final GAS scores and other outcome measures.

These results are in line with the study conducted by **Malec et al** on the effectiveness of Goal Attainment Scoring in Traumatic Brain Injured patients which compared the Goal Attainment Scoring with Portland Adaptability Inventory scores. Similarly study conducted by **Lynne Turner stokeset al** incorporating Goal Attainment Scoring in upper limb spasticity following treatment with botox also concluded the validity of Goal Attainment Scoring.

Thus The Goal Attainment Score also evaluates function and gait improvements similar to any other standardised score. Since the establishment of

goals are done in consultation with the patient, effective participation from patient is also obtained. Hence Goal Attainment Scoring method can be incorporated into clinical practice to measure changes in function along with other standardised functional measurements.

Results of this study and case analyses suggest that GAS offers the rehabilitation team a quantifiable and individualized assessment of progress that is useful for

Monitoring patient progress

Ongoing rehabilitation planning and decision-making,

Concise, relevant communication to family, referral sources

Overall program evaluation.

Our findings lead us to concur with previous authors that, in addition to documenting pretreatment expectations on change and sharpening the focus of treatment, GAS is able to capture subtle but important change in client-centered functioning. However, overall, GAS should be considered a useful adjunct to the present standardised options for assessing patient outcomes after rehabilitation.

Limitations

- Smaller size of study population meant the results cannot be generalised. The complex nature of calculations involved in goal setting and evaluation requires expertise and training and cannot be applied as such to large community set up.

- Specifically, ratings on all measures were not made by blind raters. Clinicians rating goal attainment and other outcome measures were aware of subjects' outcomes and scores on other measures.

- As others have noted, the highly individualized assessment offered by GAS may only partially meet requirements for program evaluation, because progress toward personal goals does not necessarily correspond with progress toward goals of societal value (eg, employment). A comprehensive program evaluation should include other objective measures, employment outcome, and level of independent living.

- Although academically and clinically important, it was not feasible to make a proper rigorous assessment of responsiveness of GAS. Nevertheless, the study was able to demonstrate that the scoring did actually detect the desired clinical changes.

9. CONCLUSION

The study reinforced the importance of Goal Attainment Scaling as a versatile tool to be used to evaluate change in function in rehabilitation of Parkinson patients in addition to providing a quantitative measure of service outcomes. Goal Attainment Scaling also has therapeutic utility, increasing patients' self-awareness, goal orientation as well as helping the rehabilitation process to be goal directed.

10. REFERENCES

1. Stephen Ashford et al, Goal setting, using goal attainment scaling, as a method to identify patient selected items for measuring arm function, Physiotherapy, 101(2015), 88-94.

2. Hanssen KT et al, Goal attainment in cognitive rehabilitation in MS patients. Neuropsychological Rehabilitation 2015;25(1):137-54.

   doi: 10.1080/09602011.2014.971818.

3. Lynne Turner-Stokes et al, Upper limb international spasticity study: rationale and protocol for a large, international, multicentre prospective cohort study investigating management and goal attainment following treatment with botulinum toxin A in real-life clinical practice BMJ Open 2013;3:e002230. doi:10.1136/bmjopen-2012-002230

4. KrasnyPacini et al, Goal Attainment Scaling in rehabilitation: A literature-based update, Annals of Physical Medicine and Rehabilitation 56 (2013)

5. Per Ertzgaard, et al, Practical considerations for goal attainment scaling during rehabilitation following acquired brain injury, J Rehabil Med 2011; 43: 8–14

6. Thamar JH Bovend'Eerdtetal, Writing SMART rehabilitation goals and achieving goal attainment scaling: a practical guide, Clinical Rehabilitation 2009; 23: 352–361

7. Thamar J.H. Bovend'Eerdt, PhD, Helen Dawes, PhD et al Agreement between two different scoring procedures for goal attainment scaling is low, Journal of Rehabilitation Medicine 2011; 43: 46–49

8. Colin Sharp, Philip Read, Goal Attainment Scaling in early childhood intervention, issues for implementation and evaluation, Evaluation Journal of Australasia, Volume 11, 2011, Pg 31 -41.

9. Anne F. Mannion, Goal attainment scaling as a measure of treatment success after physiotherapy for chronic low back pain, Rheumatology 2010;49: 1734–1738

10. Anne F. Mannion, Goal attainment scaling as a measure of treatment success after physiotherapy for chronic low back pain, Rheumatology 2010;49: 1734–1738

11. Janette McDougal et al, The international classification of functioning, disability for child and young and Goal Attainment Scaling: Benefits of their combined use for paediatric practice, Disability and Rehabilitation, Volume 13, issue 16, 2009

12. Goal attainment scaling as a clinical measurement technique in communication disorders: a critical review. Journal of Communication Disorders 37 (2004) 217–239

13. David J Evans et al, Goal Attainment Scaling in a geriatric day hospital, Team and program benefits, Canadian Family Physician, Vol 45, 1999

14. James F Malec, Goal Attainment Scaling and Outcome Measurement in Postacute Brain Injury Rehabilitation, Archives of Phys Med Rehabilitation 1991:72: 13843.

15. Khan F. et al. Use of foal attainment scaling in inpatient rehabilitatin for persons with multiple sclerosis. rchives of physical medicine and rehabilitation, 2008 Apr;89(4):652-9. doi: 10.1016/j.apmr.2007.09.049.

APPENDIX 1

INFORMED CONSENT LETTER

CONSENT FORM

This is to certify that I……. aged……freely and voluntarily agreed to participate in the study **EFFECTIVENESS OF GOAL ATTAINMENT SCORING AS A CLINCIAL MEASURMENT IN ELDERLY PARKINSON PATIENTS WITH GAIT ABNORMALITIES.** The observer had explained about the procedures and the benefits and risk that would occur during the study. All information given by me will be kept strictly confidential and used for research purpose.

PLACE:

DATE:

Signature or thumb impression of the patient

APPENDIX 2

TIMED UP AND GO SCORING FORM

Name: Age:

Date of Birth:

Date	Trial 1 score seconds	Trial 2 score seconds	Average	Observations

APPENDIX 3

DYNAMIC GAIT INDEX SCORING FORM

Name: Age: Sex:

	Date	Score	Date	Score	Date	Score
Walking: Level surface						
Changing Gait speed						
Walking: Horizontal Head Turns						
Walking: Vertical Head Turns						
Walking an Pivot Turn						
Step over obstacle						
Step around obstacles						
Climbing Steps						
Total Score						

APPENDIX 4

MINI MENTAL STATE EXAMINATION SCORING FORM

PATIENT: DATE:

Max score	Score obt	Test
		Orientation
5		Year, date, month, season, time(to time)
5		Place, state, street, house numb, floor, (to place)
		Registration
3		Recall 3 objects. 1 sec for each object. No. of trials -
		Attention and Calculation
5		Serial 7s. 5 answers
		Recall
3		Recall 3 objects already said in registration test
		Language

2		Name a pencil, watch
1		Repeat the word “No ifs, and, or buts”
3		Follow a 3 stage command. Take a paper fold it into half and put it on the floor
1		Read and obey the following : “close your eyes”
1		Write a sentence
1		Copy the design of overlapping pentagons
30		Total score

Level of consciousness:

- Alert
- Drowsy
- Stupor
- Coma

APPENDIX 5

Neurological Evaluation form

Name: Age: Sex:

History:

Examination: